Metrics Models and Tools for Evaluating the Impacts of Biofuels

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Biofuels at Hartsfield International Airport, Atlanta

Courtesy of Tom Fontaine, EPA

Outline of Remarks

- Policies to promote biofuel sustainability
- Tools and methods for promoting sustainability:
- Current legislative and policy approaches
- Status of Developing Metrics (International and Domestic)
- Looking ahead (New Executive Policy Group)

Promoting Sustainable Biofuel Production

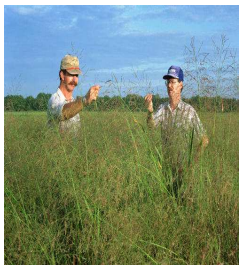
- Legal mandates (some are conflicting)
  - EISA, Farm Bill, Existing Statutes, State Mandates, Low Carbon Standards
- Policy objectives
  - EISA, Executive Actions, EU Directives, US National Action Plan
- Congressional Reports:
  - EISA Section 204 and other Reports
- Market Incentives, subsidies, tax credits (key tax credits may expire)
- Criteria and Indicators
  - Mandatory
  - Voluntary – best practices
- International Standards (ISO)
- Research and Public Education
  - Government, Academia and NAS Reports

EISA: Energy Legislation Promotes Sustainable Biofuel Production

- “Develop cellulosic and other feedstocks that are less resource- and land-intensive and that promote **sustainable use of resources**, including soil, water, energy, forest, and land, and ensure protection of air, water, and soil.”
- Limits types of feedstocks for eligibility under RFS
- Limits land sources for feedstock production
- Requires that the use of renewable fuels will result in significant reductions of GHG emissions (RFS-2).
- Requires EPA to assess environmental impacts of the biofuel system and prepare triennial reports for Congress.

Research Across the Biofuels System

Feedstock Production → **Feedstock Logistics** → **Biofuels Production** → **Biofuels Distribution** → **Biofuels End Use**



Ag Crops

Ag Residues

Energy Crops

Forest Residues

Wastes

Harvesting & Collecting

Storage

Pre-Processing

Transportation

Fuel types

Biochemical Conversion

Thermochemical Conversion

Anaerobic Digestion

Transportation

Storage

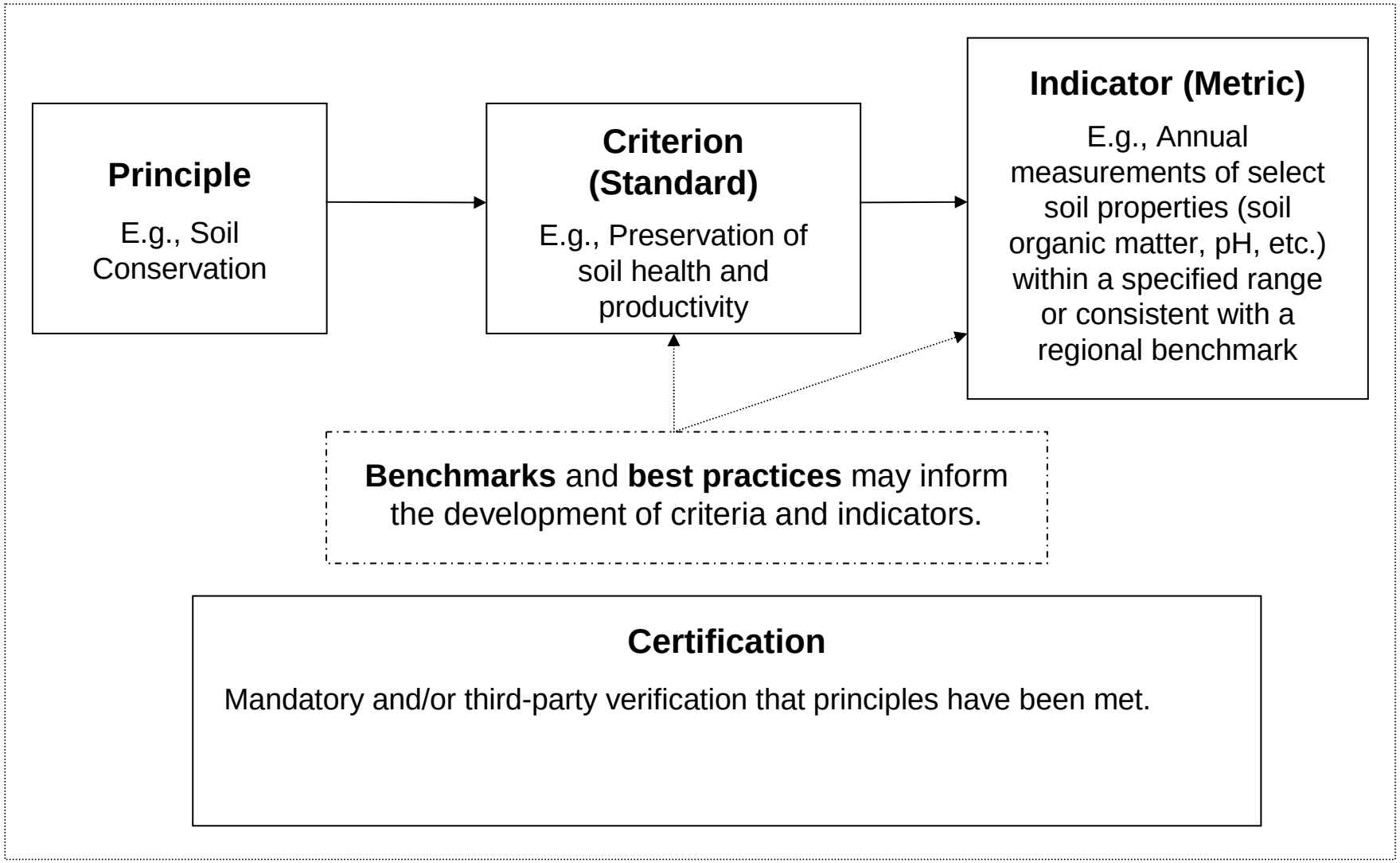
Dispensing

Transportation fuels (in light & heavy duty vehicles & trucks, off-road vehicles, locomotives, flight technologies, boats/ships)

Power & Generators

Chemical Feedstocks for Manufacturing

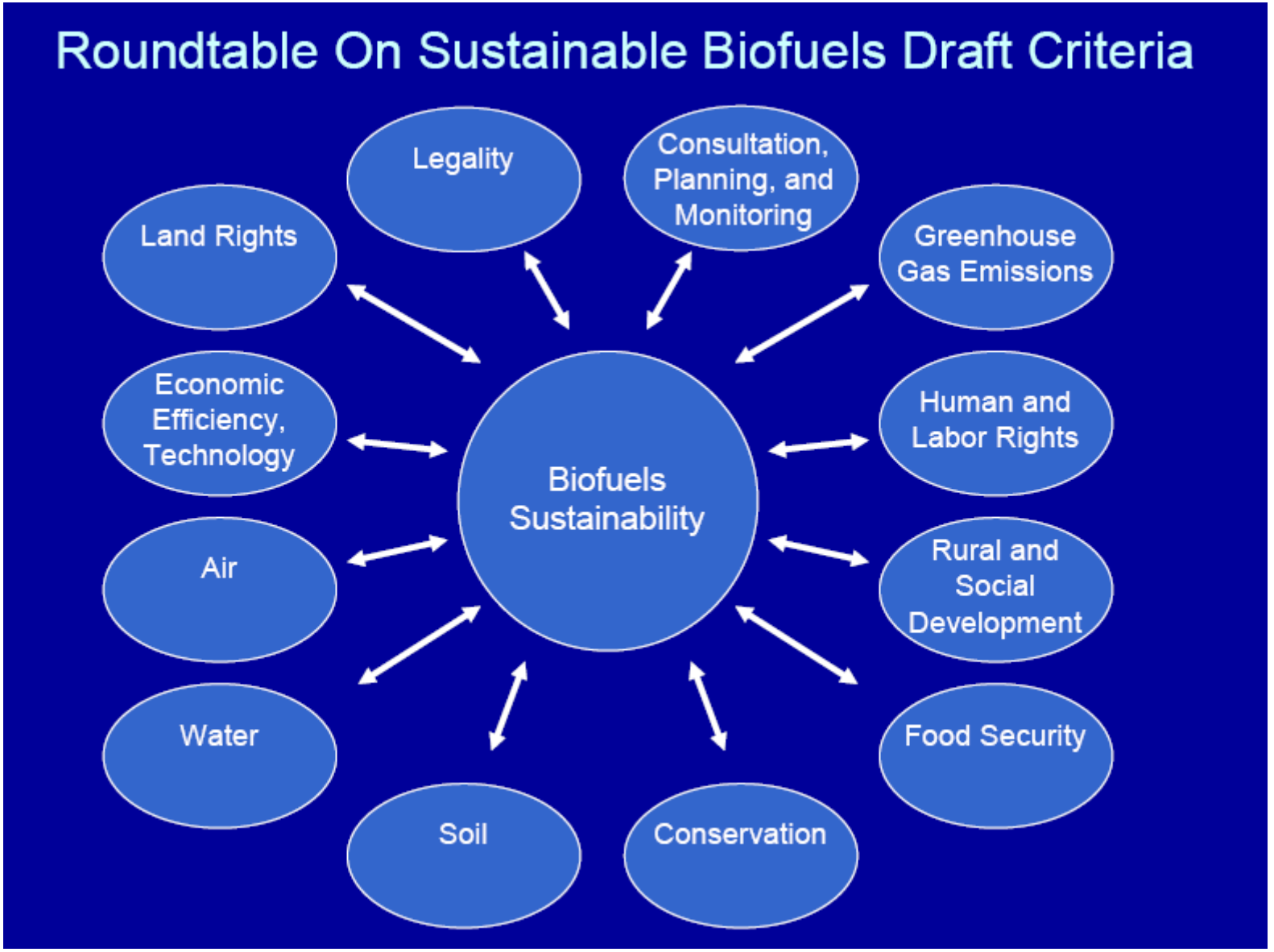
Sustainability Metrics for Biofuels



Status of International Activities

- International community continues to raise concerns on the sustainability of biofuels.
- The U.S. is proceeding to negotiate voluntary, science-based C/I in the Global Bioenergy Partnership (GBEP)
  - Preliminary Criteria list has been developed but agreement has not been reached
    (U.S. has strong difficulties with several criteria listed)
  - GBEP will begin discussing a process to develop Indicators in July with aim to start Indicator development in the Fall.
  - A solid U.S. C/I list is critical to providing guidance for U.S. action in GBEP
- ISO has commenced a process to develop industry sustainability standards for biofuels
  - U.S. is working to influence this process, including using GBEP C/I process

Roundtable On Sustainable Biofuels Draft Criteria



Global Bioenergy Partnership

Goals for GBEP Task Force

"To develop a set of **global science-based criteria and indicators** as well as examples of **experiences and best practices** including benchmarking regarding the sustainability of bioenergy [and] provide a useful platform for [stakeholders] to facilitate **sharing of information, data, experiences and best practices**."

www.globalbioenergy.org/programmeofwork/en

National Biofuels Action Plan Summary	
Board Action Area	**Actions and Milestones**
Sustainability	▸ Develop key sustainability criteria and indicators ▸ Host internal and external workshops to inventory relevant research, models and gaps
Feedstock Production	▸ Conduct feedstock availability and cost study ▸ Formulate long-term interagency research plan
Feedstock Logistics	▸ Identify R&D needs to facilitate cellulosic feedstock logistics systems demonstrations and commercialization
Conversion Science and Technology	▸ Inventory and coordinate interagency R&D activities ▸ Develop 10 year interagency research plan
Distribution Infrastructure	▸ Assess feasibility of pipeline use for biofuels transport ▸ Integrate GIS mapping capabilities across federal agencies
Blending	▸ Oversee intermediate blends testing ▸ Formulate blends policy statement
Environment, Health and Safety	▸ Inventory Federal activities ▸ Identify supply chain risks & mitigation options

Biofuel Criteria–1: Environmental

Unofficial Working Model

Bin	Criterion	Description
Environ-mental	**1. Greenhouse gases (GHG)**	LCA for specific feedstocks and fuels, processes, and transportation
	2. Soil quality and land productivity	Long-term soil quality and productivity of working lands; conservation and stewardship practices, soil quality, yield improvement, management of nutrient and chemical inputs and retention (plant stock, fertilizers, pesticides, water), and appropriate pest and disease management.
	3. Water use efficiency and quality	Water quality and water use efficiency, water reuse and treatment.
	4. Air quality	Emissions of relevant criteria air pollutants and toxics including those that are associated with acute or chronic health risks.
	5. Biological diversity	Conservation of terrestrial and aquatic biodiversity and ecosystem services in compliance with applicable laws, regulations, and treaties.
	6. Land use change impacts	Direct and indirect change in land used for and resulting from the production of biofuels.

Biofuel Criteria–2: Social

Unofficial Working Model

Bin	Criterion	Description
Social	**10. Food, feed, and fiber supply**	Impacts of biofuels production and use on the availability of affordable and secure food, water, feed, and fiber for domestic consumption and foreign export.
	11. Public health and safety	Protection of public safety and health, including incidental pollutant exposure, in all aspects of the biofuels supply, distribution, and use chain.
	12. Legal and institutional framework compliance	Compliance with applicable environmental, land, and labor laws, regulations, treaties, agreements, and executive orders pertaining to the biofuels supply and use chain.
	13. Workforce capacity	Workforce capacity as needed to meet current and future needs for the biofuels supply chain.

Biofuel Criteria–3: Energy Diversification & Security

Unofficial Working Model

Bin	Criterion	Description
Energy Diversi-fication and Security	**14. Imported oil displacement and energy supply diversity**	Biofuels as one means to diversifying energy supply by reducing reliance on imported oil and ultimately the displacement of oil-based products.
	15. Net energy balance	Net energy balance resulting from lifecycle analysis of biofuels, accounting for the entire supply chain as compared to fossil fuels.
	16. Energy access	Long-term availability, supply, and affordability of biofuels to the public, as compared to fossil fuels.

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Looking Ahead
President Obama Creates Biofuel Executive Working Group

“Identify new policy options to promote the environmental sustainability of biofuels feedstock production, taking into consideration land use, habitat conservation, crop management practices, water efficiency and water quality, as well as lifecycle assessments of GHG emissions.”

Looking Ahead: GAO Report

- Under interagency review
- Key recommendations for Executive Policy Work Group
- Should be available by mid summer.

Looking Ahead